

Modern Engineering 2019

IOP Conference Series: Materials Science and Engineering
Volume 589

Moscow, Russia
16 May 2019

ISBN: 978-1-5108-9462-4
ISSN: 1757-8981

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

This work is licensed under a Creative Commons Attribution 3.0 International Licence. Licence details:
<http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2019)

For permission requests, please contact the Institute of Physics at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of contents

Volume 589

Modern Engineering

16 May 2019, Bauman Moscow State Technical University, Russian Federation

Accepted papers received: 9 July 2019

Published online: 16 August 2019

Preface

[Modern Engineering-2019](#)

[Peer review statement](#)

Papers

[Optimization of the output device of a disk pump for high viscous fluid](#)

V Cheremushkin and A Polyakov.....1

[Optimization of Liquid Rocket propulsion system for Reusable Orbital Transfer Vehicle](#)

I Borovik, D Borovikov and A Protopopov.....12

[Finding the minimum number of optimization points for an axial aircraft pump](#)

A Protopopov, A Mukhlaeva and D Vdovin.....23

[Optimization of axial volumetric drive aviation pump](#)

A Protopopov, A Mukhlaeva and E Melnichuk.....28

[Resource Efficiency Compromise for Centrifugal Pump](#)

A Protopopov, A Mukhlaeva and B Tkachuk.....32

[Dynamics of the rotor of the centrifugal pump with not opposed scheme impellers](#)

A Protopopov, E Morozova, A Mukhlaeva and V Atamas.....37

[Hydrodynamic modelling of the impact of viscosity on the characteristics of a centrifugal pump](#)

V Tkachuk, H Navas, A Petrov and A Protopopov.....42

[Optimization of the radial channel guide vane of a centrifugal pump](#)

E Morozova, N Belov and V Cheremushkin.....49

[Optimization of a radial guide device with a no-vane transfer channel](#)

N Isaev, T Valiev, E Morozova and D Bondareva.....56

[The starting-up dynamics of the pumping station](#)

V Tkachyk, S Yakovich and A Shablovskiy.....64

[On the centrifugal pump optimization question](#)

V Tkachyk, V Atamas and A Shablovskiy.....70

[Optimization of centrifugal pump radial guide vanes](#)

E Morozova, D Bondareva and A Shablovsky.....74

[Study of multi-stage centrifugal pump guide vanes in a package of hydrodynamic simulating STAR CCM+](#)

K Abramov.....82

[Comparison of various simulation methods of a two-phase flow in a multiphase pump](#)

A Boyarshinova, V Lomakin and A Petrov.....92

[Measurements of acoustic flow parameters in the orifice on non-linear regimes](#)

A Bykov, A Komkin and V Moskalenko.....106

[Mathematical modeling and analysis of the electrohydraulic actuator with the throttle control](#)

N Sosnovsky and D Ganieva.....110

[The evaluation of the effect of gas content on the characteristics of a Centrifugal Pump](#)

M Saprykina and V Lomakin.....116

[Mathematical representation of pressure regulator with variable characteristic](#)

I Kolodin and M Ryabinin.....124

[Optimal geometric parameters selection of walking rig individual elements](#)

E Kolotvin.....135

[Definition of positive displacement pump output regulation mechanism parameters with providing of constant flow capacity in output](#)

S Barmin and O Nikitin.....141

[3D-printed polyether ether ketone samples mechanical properties estimation](#)

A Sviridov, Iu Lopatina and Iu Kurganova.....148

[Manufacturing technology stamp-welded workpieces based on porous-net material with desired properties](#)

A Tretiakov and M Serezhkin.....153

[Methods of dealing with mutual loading of joint hydraulic actuators](#)

P Shcherbachev and D Vdovin.....161

[The multifaceted role of material production in society](#)

A Mukhin, G Ganina, S Mozgin, Yu Ostrovskiy and A Yakovleva.....169

[Quad bike frame dynamic load evaluation using full vehicle simulation model](#)

D Vdovin, I Chichekin and O Ryakhovsky.....177

[Light frame design for quad bike using topology optimization](#)

D Vdovin, Y Levenkov and V Chichekin.....186

[Mathematical model of interaction of a rolling elastic wheel with elastic-visco-plastic support base taking into account the history of loading](#)

M Zhileykin, A Zakharov and M Panshin.....195

[Comparison of various simulation methods of a two-phase flow in a multiphase pump](#)

A Boyarshinova, V Lomakin and A Petrov.....205

[Comparative analysis of the use of the spiral and bladed stators in a compact high-speed centrifugal pump with hydrodynamic modeling methods](#)

A Martynyuk, A Petrov and M Kuleshova.....219

[Investigation of hermetic low-speed pumps performance when operating on highly viscous liquids](#)

A Petrov, A Morozov and M Kuleshova.....226

[Study of the corrosion rate of the paths walls of aluminum heat exchangers in the ethylene glycol antifreezes environment under developed aeration of power fluid](#)

A Petrov, G Saatashvili, A Averianov and I Bilenko.....234

[The effect of combined processing schedules on the value and nature of residual stresses in the surface layer of cylindrical friction pairs](#)

S Fedorov, A Albagachiev, M Isaenkova, A Yakovleva, V Zaripov and R Minushkin.....243

[Investigation of the performance of the oil gas separator depending on the gas content of the pumped liquid. Development of methods for optimizing the geometry of flow-through parts of centrifugal gas separators](#)

M Ershov and V Lomakin.....249

[Left ventricular assist devices of a new generation](#)

V Grishakov, S Shein and V Lomakin.....259

[Research of centrifugal gas-liquid separator](#)

G Budaev, D Danilov, A Kuznechov, V Lomakin and V Cheremushkin.....266

[Synthesis of the relay-linear control with the hysteresis region for the second order object example](#)

B Kulakov and D Kulakov.....274

[Study of the corrosion rate of the paths walls of aluminum heat exchangers in the ethylene glycol antifreezes environment under developed aeration of power fluid](#)

A Petrov, G Saatashvili, A Averianov and I Bilenko.....281

[Travelling salesman problem concerning to manipulator Kawasaki FS03N trajectory formation](#)

B Kulakov and D Kulakov.....290